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PLAN FOR COLLECTION OF FISHERIES DATA FROM U.S. TUNA PURSE SEINERS FISHING IN THE SOUTH PACIFIC

by

Atilio L. Coan Jr., Norman Bartoo and Gary Sakagawa

ADMINISTRATIVE REPORT LJ-88-19

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INTRODUCTION

A South Pacific Regional Tuna Treaty that allows licensing of U.S. tuna purse seiners to fish in the 200-mile economic zones of sixteen South Pacific island states[1] was ratified in June 1988 by the U.S. Congress. In preparation for the ratification, the Southwest Fisheries Center (SWFC) of the National Marine Fisheries Service (NMFS) developed plans to implement provisions of the Treaty with respect to port sampling of the catches made by licensed purse seiners.

A meeting was held on January 6, 1988 at the SWFC in La Jolla, California, to coordinate the planning among the major parties, NMFS Southwest Region (SWR) and the Forum Fisheries Agency (FFA), an agency designated by the South Pacific Island Governments to handle administration of the Treaty. Attending the meeting were representatives of the SWFC, SWR, FFA, and South Pacific Commission (SPC). The SPC representative participated as a technical consultant to the FFA delegation. The participants agreed that NMFS would conduct the port sampling for all parties and follow certain sampling procedures for the 1988 season. The rationale and sampling procedures that will be used are described in this document.

PURPOSE OF SAMPLING

Between 30 and 40 U.S. purse seiners are expected to be licensed to fish for yellowfin (*Thunnus albacares*) and skipjack (*Katsuwonus pelamis*) tunas in the South Pacific Treaty region (Figure 1) during 1988. In compliance with requirements of the Treaty, NMFS representatives will collect five types of fisheries statistics from these vessels and their landed catches: (1) logbook data on fishing operations, (2) unloading weights by species, (3) size frequency of landed catch, (4) species composition of landed catch, and (5) biological material.

---

[1]South Pacific states adhering to the Treaty are Australia, Cook Island, Federated States of Micronesia, Fiji, Kiribati, Marshall Island, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Solomon Island, Tonga, Tuvalu, Vanuatu, Western Samoa.

Additionally, representatives will collect secondary information on vessel operations and methods and tagged fish that are returned.

LOGBOOK DATA

Purse Seine Vessel Catch Report Forms (PSVCR Form, Figure 2) will be distributed, by NMFS representatives, to licensed U.S. purse seiners at the beginning of the fishing season. Vessel captains are required to complete this form by making daily entries when fishing in the Treaty area. The completed form will be collected by a NMFS representative upon a vessel's arrival in port for unloading or transshipment (e.g. end of fishing trip).

Three separate logs are usually maintained by U.S. vessels: captain's fishing log, navigator's log and engineer's log. The representative will use these logs and the PSVCR Form to select vessel wells that will be sampled for size and species composition. The engineer's log provides locations of catches from individual sets in wells (e.g. small and large fish from the same set that are separated and stored in different wells) and may be useful in identifying the location of a few tons of incidental species. The navigator's and captain's logs are useful for obtaining locations of single sets, vessel positions, and daily vessel activity.

To facilitate selection of wells to be sampled, pertinent information from the three vessel logs will be abstracted to a separate Logbook Abstracting Form (LA Form, Figure 3). Abstracting is a necessary precursor to selecting wells for sampling of the catch as well as in consolidating questions for later review with the vessel's captain and crew.

UNLOADING WEIGHTS

Large metal containers are used to unload tuna at ports with cannery facilities. The containers are filled on the vessel's deck, hoisted to the dock, weighed and stored in cannery holding facilities. The unloading weights by species are recorded by cannery personnel and should be routinely collected by the NMFS representative.

The Purse Seine Unloading Logsheet (PSUL Form, Figure 4) will be collected from the vessel captain, who is required to complete one for each unloading. The NMFS representative should inspect this form for any at-sea transfers of fish, as they may affect selection of wells for size sampling. At-sea transfers are usually noted on the PSVCR Form or in the captain's log.

Catches on the PSVCR Form are estimates or "hailed weights." They are not the same as the unloading weights from the canneries. After a vessel has unloaded, the NMFS representative will enter total catch by species from the PSVCR Form and unloading weights from the PSUL Form on the Trip/Unloading Form (TU Form, Figure 5) and compare the two weights. Differences between these weights can be due to catches not entered for some sets, erroneous species identification, unrecorded catches discarded or transferred at sea, or catches unloaded at an earlier date. If the difference between logged total catch and unloading weight is greater than 25%, the vessel captain should be consulted to identify the source of discrepancy.

SIZE-FREQUENCY AND SPECIES COMPOSITION DATA

The NMFS representative will schedule sampling of vessel wells in order to maximize the likelihood of obtaining samples that meet requirements of the sampling plan. The schedule will be dictated primarily by the cannery's unloading schedule, and should incorporate LA Form information on time and area of catch, and storage of sets in wells. Using this information, the NMFS representative will prepare and maintain a Length-Frequency Sampling Status Board (Figure 6), to keep track of samples taken to date and prepare a Vessel Length-Frequency Sampling Plan (Figure 7) that identifies samples to be taken from each vessel.

As vessels are unloaded, NMFS representatives will take length-frequency and species composition samples from the unloaded catch. The objective of length-frequency sampling is to compile size information for yellowfin, bigeye and skipjack tunas from various time-area strata of the catch. The objective of species composition sampling is to accurately estimate the proportions of yellowfin, skipjack and bigeye tunas in the reported catches.

Sampling will be stratified by month and by area. Five area strata have been established (Figure 1) from inspection of past catch records for uniformity of fish sizes and clustering of fishing effort. The area strata maximize the chances for sampling fish from unique month-area catches.

A <u>minimum</u> of 13 yellowfin, 13 bigeye, and 10 skipjack length-frequency samples per month-area strata will be collected. Samples of 100 fish will be collected for species composition and of 50 fish for length frequencies (Hennemuth 1957). Samples will be drawn from as many different vessels and wells as possible to maximize the accuracy of the sampling (Coan and Bartoo 1984). If time permits, more samples from strata already meeting the minimum sample size criterion will be scheduled (Wetherall and Yong, In Press).

Species composition samples will be taken whenever a mixture of fish species is encountered. Usually, skipjack are separated

from yellowfin at time of unloading. Consequently, only landings labeled yellowfin or bigeye normally need sampling to determine the amount of each species mixed in the landing.

Selection of Wells

The NMFS representative will sample wells that contain catches from one month-area stratum before sampling wells that contain catches from multiple strata. If only wells with catches from multiple strata are available, wells with catches that are layered by strata will be selected (e.g., bottom of the well, top of well, etc.). Sampling a particular layer will require waiting until the desired portion of the well is unloaded before drawing the sample.

Sampling Location

The best location for drawing samples is aboard the vessel close to the well being unloaded. As fish are unloaded, a random sample of each species can be drawn.

If sampling aboard the vessel is not permitted, then sampling should be done on the dock during offloading of the containers and before fish are stored or processed. Random samples are drawn from the containers. Information on species, well and size group (if sorting by size occurs -- see below) should be collected. Sampling should be done before the fish are size sorted whenever possible.

Size-sorted Unloading

At times the unloading crews will sort fish by size groups (small, medium, large). This size sorting makes sampling more complex. Fifty fish samples for each species from each size group must be drawn. If mixed species are encountered, species composition samples must also be taken for each size group. The unloading weight for each size group by well and for the entire vessel must be noted on the sampling form. The unloading weight by size group for the well can be estimated by counting the number of buckets unloaded for each size group. Unloading weights by size group for the entire vessel's load can be obtained from the canneries.

Size and Species Composition Sampling

Wells selected for sampling should be examined for mixed species. If mixing is detected, 100 fish will be randomly drawn and the size and species of each fish recorded. Sizes of fish must be recorded in order to determine the proportion of each species by weight in the sampled well. A Length-Frequency Form (LF Form, Figure 8) should be used to record the sizes of fish

and a Species Composition Form (SC Form, Figure 9) to record the numbers of each species. After the 100 fish are drawn and if sufficient numbers of fish are present, extra fish are drawn to complete a 50 fish length-frequency sample for yellowfin, bigeye or skipjack. Fifty fish samples of other species in the well can be drawn if sufficient quantities of these fish exist.

If mixing of species in the well is not detected, then species composition samples will not be taken. Instead, 50 fish will be randomly drawn from the selected well, measured for length and recorded on the LF Form.

Fish will be measured for fork length (tip of snout to fork in tail) to the nearest centimeter whenever possible. If fish are too large to handle, predorsal lengths (snout to anterior base of the dorsal fin) can be taken; fork-length measurements, however, are preferred. The type of length measurement must be noted on the LF Form.

BIOLOGICAL SAMPLES

Depending on time constraints, the NMFS representatives will collect biological samples from fish measured for length frequency or in the cannery at the butchering line. Exact sampling procedures will depend on the type of material (otoliths, livers, etc.) requested by researchers.

Biological samples require some form of preservation before shipment to researchers. At times, preservation requires the use of chemicals that the canneries will not allow on the premises. Also, whole fish samples usually cannot be stored safely at the cannery. Availability of laboratory and storage facilities away from cannery operations will determine the number and types of biological samples that can be collected.

TAG RECAPTURE INFORMATION

Tags are generally found as fish are removed from the wells or as fish are butchered and processed on the canning line. The NMFS representative will be responsible for collecting tag return information. Upon receipt of a tag the finder is paid a reward and all relevant information such as the name of the catcher vessel, date landed, etc. is recorded on the Tag Recovery Record (Figure 10). A summary of all tags received and rewards made will be maintained (Figure 11).

VESSEL INFORMATION

Vessel and fishing operations data may occasionally be required. NMFS representatives will be available to collect such data as time permits.

SAMPLING PORTS

The number of NMFS representatives at each landing port will depend on the volume and frequency of landings. During 1986, U.S. purse seiners fishing in the western tropical Pacific made 93 separate landings in Pago Pago, American Samoa, 35 in Guam/Tinian, 5 in Thailand, 3 in the Philippines, 3 in Indonesia and 1 in Australia.

For the 93 landings in Pago Pago, only seven times during the year did 2 vessels land on the same day; most of the time only one vessel landed per day. Under optimum conditions, the minimum time required to abstract one logbook is 1 hour and to obtain one size sample is two hours (includes species composition). Taking these and other considerations such as vacations and sick leave into account, a minimum of two representatives will be required for Pago Pago. Sampling in Guam/Tinian will probably require one or two representatives; however, since the number of landings in Guam/Tinian varies depending on transshipment costs to the vessels, coverage needs to be evaluated yearly. Landings at the other ports appear to be too infrequent to warrant on-site sampling by permanent staff; however, other arrangements for sampling could be made.

DISTRIBUTION OF DATA

Port sampling data will be prepared by the NMFS representatives: one copy retained by the field office, one sent to the SWFC and one copy (the original PSVCR Form and PSUL Form) sent to the FFA. The SWFC will enter the data to computer databases and run edit programs to screen the data for inconsistent information. After editing, the data on computer tapes will be made available to the FFA.

ACKNOWLEDGMENTS

We would like to acknowledge the assistance of Mike Hinton, Inter-American Tropical Tuna Commission, for providing general information on sampling of Pacific tunas and Frank Alverson, LMR Fisheries Research, Inc., for information on fleet movements and fish sizes in catches from the South Pacific.

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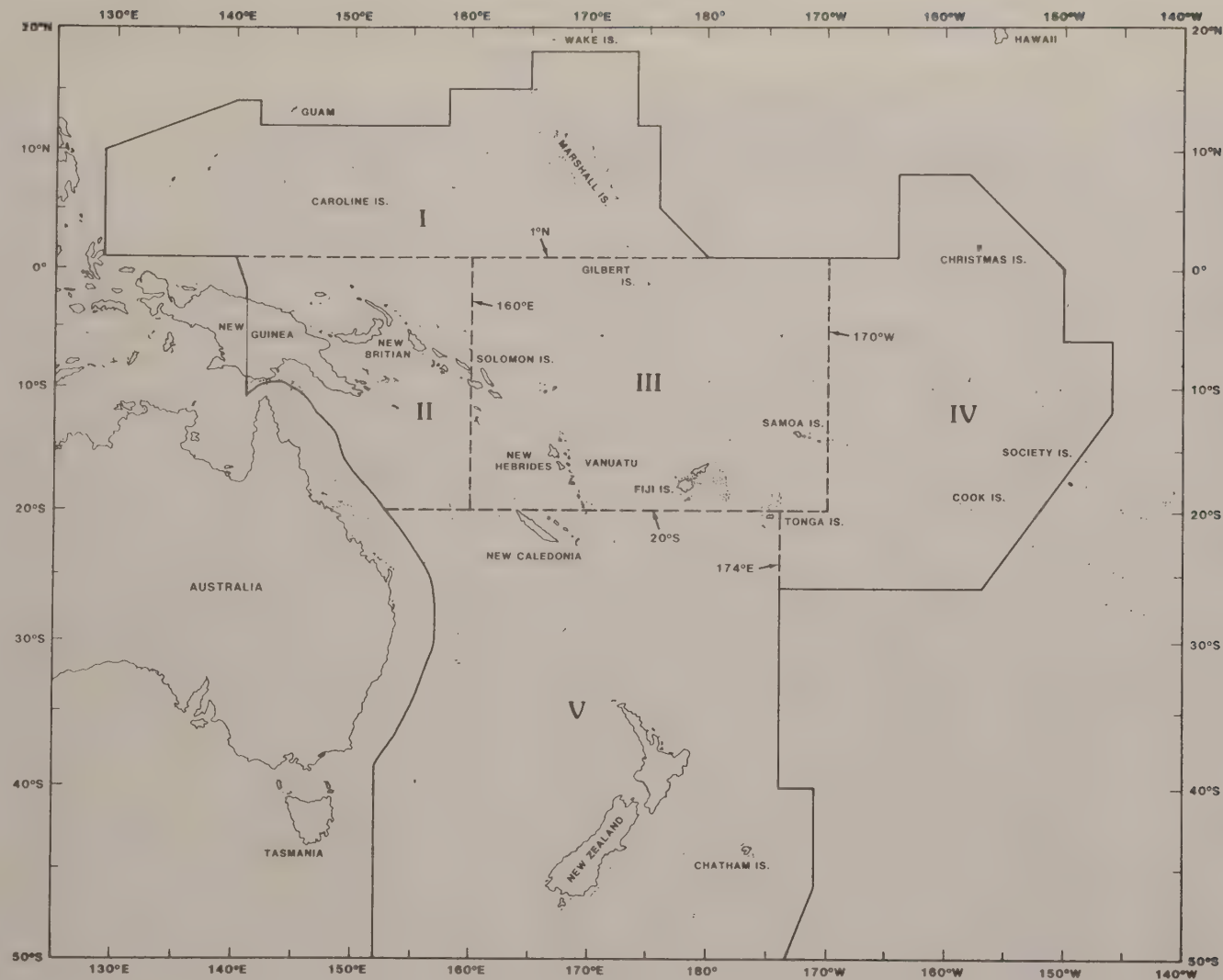

Figure 1. South Pacific Treaty region and statistical areas used for sampling of catches and fish sizes.

PURSE SEINE VESSEL — CATCH REPORT FORM

5957

VESSEL NAME ______

COUNTRY OF REGISTRATION ______

REGISTRATION NUMBER ______

GROSS REGISTERED TONNAGE ______

NAME (S) OF FISH CARRIER (S) FOR GROUP PURSE—SEINER ______

LICENCE PERMIT NUMBER ______

NAME OF CAPTAIN ______

LICENCE / PERMIT HOLDER'S SIGNATURE ______

YEAR ______ MONTH ______

	NAME		YYMMDD
DEPARTURE FROM PORT		DATE	
ARRIVAL AT PORT		DATE	

NUMBER OF CREW	

DAY	NOON OR SET POSITION				SCHOOL TYPE	TIME SET	SKIPJACK		YELLOWFIN		OTHER SPECIES			WELL	COMMENTS	DISCARD		
	LAT		LONG															
	DDMM	N S	DDDMM	E W			CATCH (st)	AV SIZE (lb)	CATCH (st)	AV SIZE (lb)	SPECIES NAME	CATCH (st)	AV SIZE (lb)	NO		TUNA (st)	OTHERS (lb)	REASON FOR DISCARD
					( )										( )			( )

NUMERICAL EXPRESSION OF SCHOOL TYPE, COMMENTS AND REASON FOR DISCARD

SCHOOL TYPE

1 Log
2 Surface
3 Whale
4 Porpoise
5 Raft
6 Other

COMMENTS

1 A full day in transit between fishing grounds or to or from fishing gounds
2 A full day not fishing due to breakdown.
3 A ful day not fishing due to bad weather.
4 A full day searching for fish but no sets made.
5 Part of day searching for fish but no sets made.
6 Set unsucessful for any reason, e.g. fish dive roll up

REASON FOR DISCARD

1 Undesirable species
2 Fish too small
3 Vessel completely loaded
4 Other reason — please specify

Figure 2. Purse Seine Vessel Catch Report (PSVCR) Form used to record daily fishing information. The form is completed by the vessel captains and is submitted to the FFA as required under the Treaty.

PAGE NUMBER ____

VESSEL NAME ____ FISHING CAPTAIN ____ NAVIGATOR ____

IATTC NO. _ _ _ _ TRIP NO. _ _ _ _ _ _ YEAR & MONTH OF TRIP START _ _ _ _ TABULATION CODE _ REGULATION STATUS _ _ CAPTAIN CODE _ _ _ _

ABSTRACTED BY _ _ _ AT _ _ _ _ _ _ _ _ _ _ DATE OF ABSTRACT _ _ _ _ _ _ _ _ WIND SCALE ___ WEIGHT SCALE ___

DATE	LOCATION	SCHOOL		SET TIME		CATCH					WIND		PLANE USE	WATER TEMP	NON SET TIME	WELLS	COMMENT CODE AND OTHER INFORMATION
		TYPE	SPECIES	START	FINISH	YF	YF & SJ	SJ	OTHER	OTHER SPECIES	DIR	FORCE					

IATTC FORM 2 REVISED 3/77

Figure 3. Logbook Abstracting (LA) Form used to record information for selecting wells for sampling of fish sizes.

PURSE SEINE UNLOADING LOGSHEET

VESSEL NAME _____ RADIO CALL SIGN OR REGIONAL REGISTER NO. _____

(1) PORT _____

OR, IF AT SEA, POSITION: LAT. _____ LONG. _____

(2) DATES

(a) AT UNLOADING POINT

ARRIVAL _____ DEPARTURE _____

(b) AT UNLOADING

COMMENCEMENT _____ COMPLETION _____

(3) PARTIAL OR COMPLETE UNLOADING _____

(4) UNLOADING TO _____

(5) (a) CARRIER VESSEL NAME _____

and RADIO CALL SIGN OR REGIONAL REGISTER NO. _____

or

(b) NAME AND ADDRESS OF COMPANY ACCEPTING FISH _____

_____

(6) DESTINATION OF FISH _____

_____

(7) QUANTITY UNLOADED

	YELLOWFIN	SKIPJACK	BIGEYE	MARLIN	OTHER	UNIT OF MEASUREMENT
ACCEPTED	_____	_____	_____	_____	_____	_____
REJECTED	_____	_____	_____	_____	_____	_____

SIGNATURES

_____ _____

VESSEL MASTER RECEIVING AGENT

Figure 4. Purse Seine Unloading Logsheet (PSUL) used to record cannery unloading weights. The form is completed by the vessel captain and is submitted to the FFA as required under the Treaty.

Vessel _____

Depart		Arrival		Days	Days	Hailed Tonnage				Wt.	Date Unldng	Gross Landings (Pounds)				Cannery or	Desti-	Notes
Port	Date	Port	Date	Out	Fished	SJT	YFT	BET	OTH	Code	Finished	SKJ	YFT	BET	Other	Carrier Name	nation	

Figure 5. Trip/Unloading (TU) Form used to compare vessel unloading weights and hailed (estimated at time of catch) weights.

LENGTH - FREQUENCY SAMPLING STATUS BOARD

MONTH		AREA STRATUM				
		I	II	III	IV	V
January	Catch					
	# Samples					
February	Catch					
	# Samples					
March	Catch					
	# Samples					
April	Catch					
	# Samples					
May	Catch					
	# Samples					
June	Catch					
	# Samples					
July	Catch					
	# Samples					
August	Catch					
	# Samples					
September	Catch					
	# Samples					
October	Catch					
	# Samples					
November	Catch					
	# Samples					
December	Catch					
	# Samples					

Figure 6. Length-Frequency Sampling Status Board used to monitor the size sampling by month-area strata.

VESSEL LENGTH-FREQUENCY SAMPLING PLAN

VESSEL NAME _____ GEAR _____

FORM NO. _____ DATE _____ CANNERY _____

NAME OF FISHING CAPTAIN _____ NAVIGATOR _____

HAILED TONNAGE _____

INFORMATION FOR SAMPLES TO BE TAKEN

DATE UNLOADED	CAPTURE DATE	AREA	WELL NO.	YELLOWFIN TONS	SAMPLE TAKEN LF/SC		SKIPJACK TONS	SAMPLE TAKEN LF/SC		OTHER SPECIES	SAMPLE TAKEN LF/SC	

SIZE SORTING INFORMATION				REMARKS
WELL NO.	TONS	SPECIES	SIZE SORT PERCENTAGE(S)	

Figure 7. Vessel Length-Frequency Sampling Plan used to prioritize size sampling of individual vessel's catches.

LENGTH FREQUENCY SAMPLING FORM

1. VESSEL: _____ 2. RANDOM / SELECT 3. SPECIES: _____ 4. SAMPLE NO.: _____

5. TRANSSHIPMENT: _____ 6. HOLD / WELL / SET: _____ 7. OCEAN: _____

8. DATE: _____ 9. MEASURED BY: _____ 10. TIME: _____

11. TONNAGE: TOTAL _____ YF _____ SJ _____ OTHERS _____

25		66		107		148	
26		67		108		149	
27		68		109		150	
28		69		110		151	
29		70		111		152	
30		71		112		153	
31		72		113		154	
32		73		114		155	
33		74		115		156	
34		75		116		157	
35		76		117		158	
36		77		118		159	
37		78		119		160	
38		79		120		161	
39		80		121		162	
40		81		122		163	
41		82		123		164	
42		83		124		165	
43		84		125		166	
44		85		126		167	
45		86		127		168	
46		87		128		169	
47		88		129		170	
48		89		130		171	
49		90		131		172	
50		91		132		173	
51		92		133		174	
52		93		134		175	
53		94		135		176	
54		95		136		177	
55		96		137		178	
56		97		138		179	
57		98		139		180	
58		99		140		181	
59		100		141		182	
60		101		142		183	
61		102		143		184	
62		103		144		185	
63		104		145		186	
64		105		146		187	
65		106		147		188	

12. TOTAL NO.: _____ 13. PREDORSAL / FORK LENGTH

14. COMMENTS: _____

NOAA 88-128 (6-88) LF 0001

Figure 8. Length-Frequency (LF) Form (front) used to record sizes of fish, catches and catch location by vessel well.

TRANSSHIPMENT INFORMATION

1. MANIFEST NO.: _____ 2. FISH CONDITION: _____
3. PORT OF LANDING: _____ 4. DATE OF LANDING: _____
5. PORT TRANSSHIPPED: _____ 6. DATE TRANSSHIPPED: _____
7. CARGO PLAN WEIGHT: TOTAL _____ YF _____ SJ _____ OTHER _____
8. MANIFEST WEIGHT: TOTAL _____ YF _____ SJ _____ OTHER _____
9. SIZE BREAK DOWN: _____ 10. MIXED / PURE
_____ 11. FLAG: _____
_____
_____
_____

12. COMMENTS: _____
_____
_____
_____

CATCHER VESSEL INFORMATION

1. FLAG: _____ U.S. _____ OTHERS _____ 2. AREA: _____
3. MONTH: _____ 4. CLASS: _____ 5. MIXED / PURE
6. PORT OF LANDING: _____ 7. DATE OF LANDING: _____
8. SET DISTRIBUTION: 9. WELL: _____

DATE	AREA	CATCH				WELLS
		YF	MIXED	SJ	BE	

10. COMMENTS: _____
_____
_____

SINGLE SET INFORMATION

1. LATITUDE _____ ° _____ ' LONGITUDE _____ ° _____ ' 2. MIXED / PURE
3. TYPE OF SET: _____
4. COMMENTS: _____
_____
_____
_____

Figure 8 (cont.). Length-Frequency (LF) Form (back) used to record sizes of fish, catches and catch location by vessel well.

SPECIES COMPOSITION

Reporter: _____ Species: _____ Sample #: _____

Date: _____ Reported from: _____

Catcher Vessel: _____ Gear: _____

Flag: _____ Date of catch: _____ Area: _____

Transshipment Vessel: _____

Hatch/Well/Set: _____ Sort Type: _____

Unloading Weight (S/T): _____ Size Code: _____

Total: _____ YF: _____ SJ: _____

Other: _____

Species	Number of Fish	Freq. Sample Number	Biolo. Sample Number	
Yellowfin				
Skipjack				
Bigeye				
Albacore				
Bluefin				
Blk. Skipjack				
Others				
UNK.(YE/BE)				
Total				

Comments: _____

LF0002

Figure 9. Species Composition (SC) Form used to record proportions of each species in the catch by vessel well.

TAG RECOVERY RECORD

Finder _____

Vessel _____ Gear _____

Area of Recapture _____ Date of Recapture ___/___/___ (Day Mo. Yr.)

Tag Number _____ Y R (color) Well _____

Species _____ Date Found ___/___/___ (Day Mo. Yr.)

Length/Weight _____ (F S) City Found ___/___/___ (Day Mo. Yr.)

Place Found _____

Samples Collected otoliths ☐ Spines ☐

Date Sampled ___/___/___ stomach ☐

Fish Number ☐

Place Mailed _____ Date Mailed ___/___/___ (Day Mo. Yr.)

Reward Paid _____ Date Paid ___/___/___ (Day Mo. Yr.)

Comments & Notes: Signature _____

Figure 10. Tag Recovery Record used to record weight, length, catch area and other information for tag returns.

MONTHLY SUMMARY OF TAGS AND REWARD PAYMENTS

For Month of _____

Tag No.			Reward Accounting				
Yellow tag	Red Tag (without fish)	Red tag (with fish)	REWARD PAYMENT DELAYED OR WITHHELD (EXPLAIN)	Reward given by this office			Tag sent to
				For fish ($16)	For tag ($4)	T-shirt ( )	
			MONTHLY TOTAL				

Figure 11. Monthly summary of tags and reward payments form used to account for distribution of rewards.